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EPA (Environmental Protection Agency) Research Program Guide

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Washington, DC

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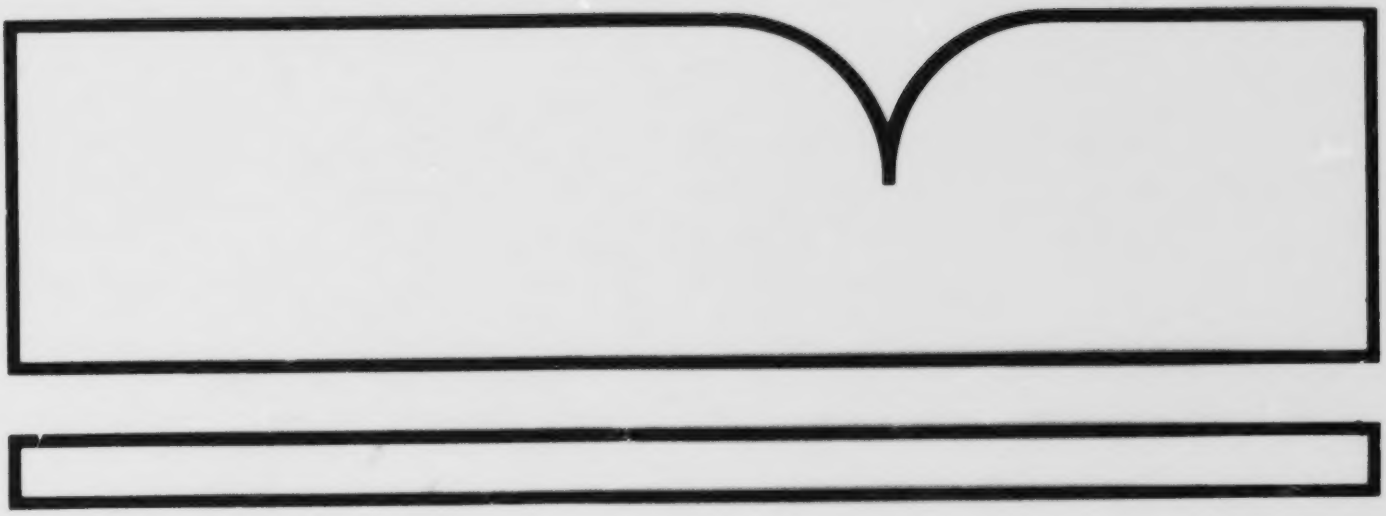

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EPA Research Program Guide

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Notice

The program descriptions and resource estimates included in this document reflect the latest detailed information available at time of publication. Time will change some of this information. In addition, the resource figures have been rounded off and some smaller programs omitted. For the latest information, you may want to contact the individual listed.

This report was prepared by the Technical Information Office within EPA's Office of Research and Development. For further information, call either Cynthya Holley, Linda Jackson or Katherine Weldon at 202-382-7458.

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September 1983

EPA Research Program Guide

October 1, 1983 — September 30, 1984

Technical Information Office
Office of Research and Development
U.S. Environmental Protection Agency
Washington DC 20460

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Introduction

The free and open exchange of knowledge both stimulates and provides quality control for the progress of science. This report provides information on the research which EPA is planning for fiscal year 1984, on how much we intend to spend on each program area, and on whom to contact for further details. More than 58 percent of our $244.5 million fiscal year 1984 research budget will be spent through extramural contracts, grants and cooperative agreements with organizations outside of EPA's laboratories.

It is our intent to increase the efficiency and effectiveness of this research by placing great emphasis upon open competition for extramural support. We hope that the information in this report will stimulate qualified parties and to make their capabilities known to our research managers so that we all might gain from a sharing of experience and expertise. Please feel free to contact any of the parties listed in this report.

How to Use the Program Guide

The following descriptions of ORD's research program are organized first by media such as air, water, hazardous wastes, etc. These categories are further broken down into research foci such as scientific assessment, monitoring and quality assurance, health effects, environmental processes, and engineering technology. Each description is a very broad summary of the research being done, where that research is being done, who to contact for more information about the program, and both the approximate total funding for that area and the percentage of total funding which is reserved by EPA for in-house research. Funding which is not reserved for in-house research is spent through extramural contracts, grants and cooperative agreements.

For each program description, one or more contacts are listed along with the major research areas to be pursued. For further information, you may call the contacts. Their commerical and Federal (FTS) telephone numbers are listed in a separate section near the end of this report. Where two or more research laboratories are listed, please turn to the "EPA R&D Organization" section of this report for descriptions of the major mission and functions of each.

Some of the research funded for fiscal year 1984 will be done in-house by EPA's laboratories. The rest will be accomplished extramurally. Proposals for funds for research in areas of interest to the agency are welcomed and are considered on a competitive basis. To receive information regarding application procedures for extramural funds, please contact the person indicated in the area of specific interest to you. In addition, approximately fifteen percent of EPA's research budget is used to support long-term exploratory research. Information regarding funds for exploratory research grants can be obtained from the:

Office of Research Grants and Centers (RD-675)

U.S. EPA
Washington DC 20460
(202) 382-5737

Finally, for further information regarding EPA research publications, or for additional copies of this report, please contact:

Center for Environmental Research Information

U.S. EPA
26 W. St. Clair
Cincinnati, Ohio 45268
(513) 684-7562

Air Gases and Particles

Scientific Assessment

The main objective of the scientific assessment program for gases and particles is to develop *criteria documents* for sulfur oxides, particulate matter, and lead. Criteria documents are used in regulatory decision making related to setting or revision of National Ambient Air Quality Standards. Criteria documents summarize scientific data on the health and welfare effects of a specific pollutant.

The program is presently focussed on revising the air quality criteria document for lead (Pb). An external review draft of the Pb document, prepared by agency scientists and non-EPA expert consultants, will undergo external peer review by the Clean Air Scientific Advisory Committee (CASAC) of EPA's Science Advisory Board. The final document will be available in late 1984.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ECAO /RTP	Dennis Kotchmar	935	47
OHEA/HQ	Donna Kuroda	101	100

Monitoring Systems and Quality Assurance

Improved air pollution monitoring methods are being developed to help determine air quality trends, support compliance with standards, and meet enforcement needs. The data from these methods are often used as the basis of regulatory action. The areas we intend to investigate extramurally are: methodology development for ambient and source methods, development of quality assurance quidelines and procedures, and audit materials.

Ambient and source monitoring *methods* for gases and particulate matter pollutants will be developed and evaluated. Ambient methodology development will focus on methods for measuring particulate matter in support of anticipated changes to the National Ambient Air Quality Standards. Source methods will be developed and evaluated under field conditions. In addition, EPA researchers will continue to analyze the mass and chemical composition from the 7,000 filters collected annually through the Inhalable Particulate Network. Also, fiber filters from national, state and local air monitoring stations will be analyzed for mass and trace metals.

Quality Assurance (QA) support will be provided through a standards laboratory and repository of quality assurance materials. Routine and special *audits* will be conducted on laboratories making ambient and source measurements and on compressed gas ven-

dors. Quality assurance guidelines, handbooks, data handling systems, and a precision and accuracy reporting system will be maintained and updated. QA procedures, materials, and audit techniques will be developed for compliance monitoring.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/RTP	John Puzak	5,162	55
EMSL/LV	Robert Snelling	422	69
OMSQA/HQ	J. M. Shackelford	147	100

Health Effects

This research program has three major goals: to provide data on health effects of exposure to gases, SO_2, particles, and lead using both human and animal studies; to provide better models to extrapolate animal data to humans, and to develop improved test methods for research into the physicological response of humans to gaseous air pollutants and particles.

Much of the health effects research refines and improves the toxicological data base relevant to a *size resolved particle standard*. Fine-mode particles, mostly in the 1-2 micron range, will be studied in normal and susceptible human and animal populations. Both human and animal dose-response studies will devote special attention to determining the deposition, clearance, and pulmonary function effects of particles, alone and in combination with ozone, NO_3, and SO_2. Most of the human work is done in-house, while many of the animal studies are done extramurally.

The *neurological consequences* of lead, especially at levels previously considered to be safe in children, will be studied. The significance of the effects noted will be evaluated for use in assessing health risks.

In 1984, work will be done to provide faster, more reliable, *extrapolation techniques* using animal data to predict human pulmonary and morphological responses to gas and particle exposure. About half of this work will be done by contract. Research will also provide data on biochemical, pulmonary, and cardiovascular disease and impairment in susceptible populations following SO_2 exposure.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL/RTP	Dick Dickerson	8,705	42
OHR/HQ	Karen Morehouse	221	55

Air Gases and Particles

Environmental Engineering and Technology

Existing technology to control gaseous and particulate pollutants is expensive. For new utility sources, aproximately 30% of boiler cost are attributable to air pollution control. Design and performance data for low cost, high-reliability *emission reduction technology* are needed to support the agency's regulatory functions. Research will focus on evaluating the fundamentals of combined SO_x and fine particle emissions capture for conventional and advanced devices. Sulfur oxides work will emphasize evaluation of lower cost, more active sorbents and additives for dry scrubbing systems. Other studies will explore promising low-cost retrofit technologies with potential for controlling acid rain precursors. In addition, several advanced concepts for lowering the cost of particulate control baghouses and electrostatic precipitators (ESP) will be investigated. The range of work will include analyses of wide-plate spacing and large diameter electrodes for ESP's and electrostatic enhancement for baghouses. Assessment will be made of combinations of air pollution reduction technologies and of the impacts of varying coal composition on plant operation. Symposia and workshops will be used to transfer the technology.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
IERL/RTP	Everett Plyler	3,792	59
OEET/HQ	George Rey	198	100

Environmental Processes and Effects

The objectives of this program are to develop air quality models in support of the National Ambient Air Quality Standards (NAAQS), and to develop information on the effects of gases and particles on crops and materials.

Model development research will focus on improved atmospheric dispersion parameters in air quality models, SO_2 air quality dispersion models for use in complex terrains, and particulate dispersion models for use on urban, meso-, and regional scales. Procedures for computing dispersion from elevated sources and near-source dispersion models for use in complex terrain will be improved. A full-scale plume study will take place in less idealized terrain than that used in previous studies. Work will improve urban and regional scale particulate models to support anticipated revisions of State Implementaion Plans (SIPs) for particulate matter. Full-scale efforts will begin in 1984 to develop a regional scale particu-

late matter air quality model which will accurately describe the long-range transport of particles and alternative control strategies. First generation source apportionment methods (SAM) will be developed.

Within the *effects research* area, the occurrence of ground-level concentrations of pollutant mixtures (SO_2, O_3, and HO_2) will be evaluated to determine the distribution of potentially adverse air quality conditions involving pollutant mixtures and to guide the development of exposure regimes for dose/ response experiments. Studies on materials damage will develop estimates of the cost of air pollution in terms of damaged materials or accelerated maintenance schedules. Studies will also be conducted to determine the air pollution and meteorological factors that contribute to visibility reduction.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ESRL/RTP	Al Ellison	8,501	25
ERL/Cor	Eric Preston	190	42
OEPER/HQ	William Keith	589	56
	David Weber		

Air Oxidants

Scientific Assessment

Photochemical oxidants are secondary pollutants produced by chemical reactions in the atmosphere between primary pollutants, notably nitrogen oxides, and volatile organic compounds (VOC). Ozone (O_3) is by far the most abundant of the photochemical oxidants.

A *criteria document* evaluates the available scientific information on the health and welfare effects of a criteria pollutant and, as such, is the primary source of information used by EPA regulatory decision makers in reviewing and possibly revising NAAQS. EPA scientists and expert consultants are developing draft chapters for the ozone/photochemical oxidants criteria document. This document critically assesses data on health effects from ozone and pollutant mixtures, and environmental effects related to crop loss. An external review draft will be available for review during 1984.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ECAO/RTP	Beverly Tilton	1,015	41
OHEA/HQ	Donna Kuroda	53	100

Monitoring Systems and Quality Assurance

Research activities in this area emphasize the development of monitoring *methods* and the provision of quality assurance *samples* and support. EPA's research with regards to *monitoring methodology* for oxidant precursors will include an evaluation of volatile organic compound monitoring methodology and production of both an operations manual and performance guidelines for commercial monitoring instruments. The National Atmospheric Pollution Background (NAPB) network, and ozone monitoring network for determining background ozone concentrations in remote areas (national forests), will be completed in 1984. In addition, laser technology to measure aerosol mass associated with oxidant transport will be provided as technical support to the regions. Extramural resources will be focused primarily on the operation of the NAPB network and on the development of standard reference materials by the National Bureau of Standards (NBS).

Quality Assurance for the oxidants research program is essential to ensuring that the data used for regulatory and enforcement decisions is accurate. Reference samples, gas samples, permeation devices

and flow rates standards traceable to NBS will be supplied to the user community. Short-term monitoring support will be provided to the OAQPS and the EPA regional offices for use in review of State Implementation Plans for air transport model development.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/RTP	John Puzak	682	70
EMSL/LV	Robert Snelling	240	83
OMSQA/HQ	J. M. Shackelford	77	100

Health Effects

This program has two major goals: to provide data from human and animal studies on a full range of health effects of O_3 and NO exposure, and to provide better models to extrapolate animal data to humans.

The health effects *data* from this program is incorporated into EPA criteria documents. Research provides data on the degree to which oxidants cause or exacerbate the development of non-carcinogenic chronic disease. Biological endpoints to be examined include development of cardiovascular or pulmonary disease, aggravation of existing conditions, changes in biochemistry and host defense mechanisms, and changes in pulmonary structure or functions. Animal test data is relied on to set and revise standards.

Tests will be run to improve the *models* used to *extrapolate* animal biochemical and metabolic responses to human effects. Both human and animal experiments will provide data on the functional, morphological, and biochemical changes which occur following exposure to ozone and NO_2. Animal dose-response studies, many performed extramurally, will concentrate on the effects of chronic exposure of rodents to oxidants.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL/RTP	Dick Dickerson	3,698	38
OHR/HQ	Karen Morehouse	190	47

Environmental Engineering and Technology

Research in this program supports the development of New Source Performance Standards (NSPS) and of State Implementation Plans by aiding in the development of pollutant control technology which is cost-effective and energy-efficient. The focus of the research is on the reduction of both VOC and NO_x emissions.

Air Oxidants

Volatile Organic Compounds (VOCs) are a major cause of non-attainment of National Ambient Air Quality Standards. Extramural research will evaluate *VOC abatement technology* such as carbon adsorption, thermal oxidation, and catalytic oxidation. Of particular interest will be effective and affordable control methods for small VOC-emitting industries.

Combustion modification methods of controlling NO_x and other emissions will be evaluated to determine whether cost and efficiency can be improved. Under extramural programs, EPA researchers will assess in-furnace (post-flame) reburning for NO_x control on gas, oil and coal-fired bench-scale combustors; coal pellet stoker technology for field use with heavy-oil fuels; combustion modification methods applicable to industrial glass furnaces; and heavy oil, low-NO_x burners.

Fundamental research on *combustion processes* will also be conducted to improve the technical basis for estimating achievable emissions, to help develop NO_x-SO_x emissions reduction technologies and to support development of an industrial boiler NSPS.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
IERL/Cin	Alden Christenson	1,005	54
IERL/RTP	Eugene Tucker Joshua Bowen	2,188	41
OEET/HQ	Kurt Jakobson	89	100

Environmental Processes and Effects

The major objectives of this program are to develop and validate air quality models that predict the formation of photochemical oxidants (primarily ozone) in the atmosphere, and to determine the economic impacts of ozone on agriculture.

Air quality models predicting the air quality impacts associated with air pollutant abatement strategies are used in the evaluation and development of State Implementation Plans for the control of photochemical oxidants. Two major types of ozone air quality models are under investigation: urban scale which focuses on local air quality impacts and regional scale which addresses the long range transport phenomena of ozone and its precursors (volatile organic compounds and nitrogen oxides). Over the next few years, emphasis will be placed on developing a better chemical mechanism within the models for describing ozone formation in the atmos-

phere. Also, a second generation regional scale model for ozone will be developed. The accuracy of the regional ozone model developed from the Northeast Regional Oxidant Study (NEROS), will be tested.

A preliminary national assessment on the *economic impacts* of ozone on agriculture will be provided for incorporation into the EPA criteria document used to update the NAAQS for ozone. Research will also be conducted to improve the accuracy of crop loss assessments. This will include: the evaluation of the effects of ozone on the yield of representives of the hay crop group, the examination of ozone response differences among crop varieties, and the determination of the influence of soil/water relations on ozone responses.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ESRL/RTP	Basil Dimitriades	2,754	31
ERL/Cor	Eric Preston	1,053	80
OEPER/HQ	Deran Pashayan David Weber	135	38

Air Mobile Sources

Scientific Assessment

The Clean Air Act requires the agency to prescribe emission standards for carbon monoxide, hydrocarbons, and oxides of nitrogen for heavy-duty and light-duty vehicles. To do this, the agency requires information on the chemical composition of fuels, fuel additives, and diesel and gasoline exhausts, as well as information on actual human exposure to motor vehicle pollutants.

The scientific assessment program will revise the carbon monoxide *criteria document* between 1984 and 1986. In addition, work will be done on a *carcinogen risk assessment* on diesel emissions and on an assessment for unleaded gasoline.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ECAO/RTP	James Raub	467	9
OHEA/HQ	Herman Gibb	10	100

Monitoring Systems and Quality Assurance

Research in this area will focus on measurement of population exposures to carbon monoxide. The extramural funds will be primarily used to analyze data from current CO studies. Field studies done in Washington, D.C., and Denver, Colorado have provided human exposure data bases. The existing National Ambient Air Quality Standard (NAAQS) is designed to assure that 99% of the population has blood levels below 2.5% carboxyhemoglobin. Data from the field studies will be used to assess the proportion of the population below this level and to test the validity of existing human exposure models. The field studies will be evaluated for their applicability to other criteria air pollutants and to unregulated mobile source air pollutants, including organics and respirable particulates.

The registration of fuels and fuel additives, as mandated by Congress, will be maintained. Also, the quality assurance program will distribute samples and otherwise assist state and local agencies in generating precise and accurate air monitoring data for use in judging compliance with NAAQS.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/RTP	G. Akland	835	59
OMSQA/HQ	Wayne Ott	49	100

Health Effects

The health effects program in mobile sources develops and validates techniques to produce dose-response data on the toxic effects of carbon monox-

ide, and then uses those techniques to produce dose-response information. This is largely an in-house program with a small amount of extramural support.

Clinical studies will be used to produce dose-response data on the toxic effects of low-level exposure to CO. The cardiac and respiratory effects of CO will be evaluated in human studies, as will a method to relate ambient CO levels to blood levels. Non-invasive techniques will be used to measure the cardiac effects of CO exposure. This information will be used in performing health risk assessments by the scientific assessment program.

Funding will also be provided to the Health Effects Institute, sponsored jointly by EPA and the automobile industry to perform research on the health effects of pollutants related to mobile sources.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL/RTP	Richard Dickerson	822	69
OHR/HQ	Hugh McKinnon	3,000	0

Environmental Processes and Effects

The focus of this program is to provide information necessary to evaluate the impacts of regulated and unregulated mobile source emissions on ambient air quality. Research is conducted to characterize gaseous and particulate emissions, including volatile organic components from in-use light and heavy duty diesel and gasoline powered vehicles. Emissions data is obtained through tests conducted under simulated conditions using dynamometers.

Research in FY-1984 will focus on characterizing emissions from late model light-duty diesel vehicles; refining and/or developing measurement procedures to permit accurate analysis of methanol and formaldehyde emissions from vehicles fueled by pure methanol and methanol/gasoline blends; characterizing emissions from future model year diesel vehicles with and without particle control devices; determining impact of methanol fuel emissions on ozone air quality, and assessing the effect of low ambient temperature on emissions from late model vehicles. Information obtained will be used to update emissions factor data bases used in air quality models to assess the impacts of mobile source emissions on ambient air quality.

Office or Laboratory	Contact	Total Funds($k)	Percent In-House
ESRL/RTP	Ron Bradow Frank Black	900	55

Air Hazardous Air Pollutants

Scientific Assessment

Scientific assessments of hazardous air pollutants (HAP) encompass all known research findings concerning the health and environmental effects of particular substances and/or their transformation products, as well as background information on physical and chemical properties, sources, emissions, transport and transformation, and ambient concentrations.

The current agency strategy for evaluating hazardous air pollutants calls for assessing the toxicity of 37 chemical substances, and for reviewing the health basis for existing HAP regulations for several other substances. Drafts of 15 documents initiated during or before FY 1983 (i.e., on trichloroethylene, perchloroethylene, methylene chloride, nickel, manganese, chromium, arsenic, chlorobenzenes, dioxin, hexachlorocyclopentadiene, vinylidene chloride, epichlorohydrin, chloroform, ethylene oxide, and ethylene dichloride) are expected to undergo external peer review by EPA's Science Advisory Board (SAB) during FY 1984. Completion of SAB review for all 37 chemicals is planned by the end of FY 1987. In addition, documents evaluating updated health data bases underlying existing HAP regulations for mercury, beryllium, asbestos, and vinyl chloride were initiated in FY 1983 and are to be completed in FY 1984, as are other assessments re-evaluating the health effects of cadmium and polycyclic organic matter (POM) in light of new scientific information.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ECAO /Cin	William Pepelko	300	43
ECAO/RTP	Frances Bradow	2,023	25
OHEA/HQ	Donna Kuroda	932	90

Monitoring Systems and Quality Assurance

At present, there is a particular need for technology to monitor non-criteria contaminants at the regional, state, and local level. EPA maintains a monitoring station for non-criteria pollutants in Philadelphia. This station will function as a focal point for development and evaluation of methods for the characterization of monitoring methods. Stationary source methods will be evaluated and validated. This will involve measurement of instrument drift, establishing control limits, defining out-of-control limits, and specifying corrective action and alternate methods. Focus will be on developing and assessing advanced methods for concentrating and analyzing samples. The advanced methods to be evaluated are:

cryogenic preconcentration, tuneable atomic line molecular spectrometry, and gas chromatography/ fourier transfer infrared spectrometry. The methods that will be evaluated at the center were developed from our extramural program.

To support quality assurance needs within the program, reference samples will be developed and maintained, guidelines for procedures will be developed, and laboratory audits will be performed.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/LV	John Clements	4,523	39
OMSQA/HQ	Lance Wallace	517	23

Health Effects

The health research program in hazardous air pollutants (HAP's) has three goals: to develop and validate methods to produce dose-response data on the toxic effects of HAPS, to produce the dose-response data on the toxic effects of HAPs, and to develop models which improve our ability to use dose-response data in risk assessments. Extramural research will support efforts in all three areas.

EPA researchers will develop *methods* to provide data on the genetic, developmental, and neurotoxic effects of HAP's. Emphasis of this research will be on the toxic components of gaseous-aerosol complex mixtures.

In *dose-response* toxicological research, data on the mutagenic and carcinogenic activity of potential HAP's will be determined. These HAP's will be selected based upon assessments prepared by the Office of Health and Environmental Assessment (OHEA). The effects of selected chemicals suspected of being hazardous to the nervous system will be studied.

Animal *models* of respiratory physiology and function will be developed to provide more reliable methods for estimating specific doses to critical lung tissues. Models of neurologic toxicity will be developed involving physical, chemical, and behavioral tests to predict human responses to insult from potential HAPS.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL /RTP	Richard Dickerson	2,587	71
OHR/HQ	Hugh McKinnon	120	100

Air Hazardous Air Pollutants

Environmental Engineering and Technology

The engineering program for hazardous air pollutants (HAP) is comprised of two distinct parts: (1) to assess various industrial and combustion sources of HAPs to determine the magnitude of emissions and to assess the capability and performance of technologies to reduce or eliminate HAP emissions, and (2) to characterize the dependence of indoor air pollution levels on source strength and other parameters.

Current EPA regulatory strategy calls for the development of additional HAP emission factors and control technology performance data. The existing HAP data base for source emissions and emission reduction technologies will be expanded to provide this information in engineering research programs. Research will assess the emission rates and characteristics of a variety of industrial and combustion sources of HAP; other projects will determine cost-effective emission reduction techniques and strategies supportive of the development of NESHAPs.

Indoor air quality research will characterize important sources, and evaluate and compare the tradeoffs among *in situ* capture of emissions, inhibition of emissions, and process modifications as a function of cost, comfort, and indoor air quality. This research will develop emission rate data characterizing important sources of indoor air pollution and develop an understanding of fundamental principles affecting emissions from indoor sources.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
IERL /RTP	Eugene Tucker	818	21
OEET/HQ	David Berg		

Environmental Processes and Effects

The goal of this research is to provide information on the *atmospheric transport*, *transformation*, and *fate* of hazardous air pollutants. The information is used in preparing health assessment documents to determine if the chemicals present a hazard. Studies will: identify, through application of structure activity relationships, innocuous chemicals which, after being emitted, may be transformed into more hazardous air pollutants; determine deposition and reaction rates of hazardous chemicals; and identify the factors responsible for concentration levels and spatial and temporal (i.e., seasonal) variability of 45 selected volatile compounds.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ESRL/RTP	Larry Cupitt	863	37

Drinking Water

Scientific Assessment

Revision of national drinking water regulations and health advisory guidance given to the states requires an assessment of the potential hazard to human health from exposure to chemicals in drinking water. Health assessment documentation will be finalized for three chemicals (lindane, toxaphene, endrin) and initiated for six more in FY 1984.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ECAO /Cin	Steven Lutkenhoff	152	80
OHEA/HQ	Mary Holland	72	100

Monitoring Systems and Quality Assurance

This program will provide the overview for the Agencywide mandatory quality assurance program. The ten regional laboratories will be evaluated annually in support of the National Interim Primary Drinking Water Regulations monitoring certification program. This program will also provide methods development and analytical procedures to produce precise and accurate total measurement systems for chemical, radiochemical and microbiological analysis. It will provide technically and economically feasible analytical procedures to monitor contaminates for use by the Agency, States, municipalities and operators of public drinking water systems. In addition, the following groundwater program will be provided; development of a method to locate abandoned wells; development of geophysical methods to detect and evaluate underground movement of fluids from injection wells; evaluation and development of fiber optics techniques for monitoring groundwater; development of accurate and reliables total measurement systems through the development of standardized methods, laboratory evaluation, performance evaluation and quality control sample development, sample testing and verification; and provide quality control procedures and guidelines.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL /Cin	Robert Booth	1,074	85
EMSL/LV	Glenn Schweitzer	1,340	38

Health Effects

This research program provides dose-response data on organic, inorganic, and microbiological contaminants. It provides information on the best methods to obtain that data, and information on the

best methods to perform risk assessments.

Selected contaminants will be evaluated (chlorinated ethanes, vinyl chlorine, chlorobenzene, asbestos, barium and fluoride), for possibly setting Maximum Contaminant Levels or developing Health Advisories. Increasing emphasis will be on determining the health effects of exposure to disinfectants and their by-products. Work will be done to improve methods for extrapolating health effects research data in order to assess the risks associated with simultaneous exposure to multiple chemicals in complex mixtures. Focus will also be on concentrating, isolating, and identifying infectious disease agents in drinking water. Finally, in conjunction with the Centers for Disease Control, research will design methods to identify and evaluate outbreaks of waterborne infectious diseases in order to aid the states in alleviating any emergency affecting public water systems.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL/RTP	Richard J. Bull	9,022	39
OHR/HQ	Frode Ulvedal	327	34

Environmental Engineering and Technology

To support revision of the national drinking water standards, this program provides data on the technologies available, what they can attain in terms of drinking water quality, and what they cost. Focus is on removal of volatile organic compounds, organics formed during treatment, naturally occurring organics responsible for formation of trihalomethanes and inorganic contaminants. Emphasis will be on developing cost information for treatment processes and for entire water systems. Evaluation will also be made of the tradeoffs in planning for rehabilitation of older water systems. In addition, efforts will be made to address the problems of small utilities and to assist the states and municipalities in complying with maximum contaminant levels.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
MERL/Cin	Gordon Robeck	5,920	39
ERL/Athens	William Donaldson	317	60
EMSL/Cin	Bob Booth	230	61
OEET/HQ	Curtis Harlin	148	100

Ground Water

Environmental Processes and Effects

Ground water is a major source of drinking water for the nation. This research program seeks to improve methods for determining the transport and transformation of contaminants in the subsurface, methods for predicting the behavior of pollutants in aquifers based on site-specific subsurface characteristics and on characteristics of the pollutants. In addition, research will evaluate in-situ aquifer reclamation methods.

Extramural efforts will be directed toward several areas. Methods will be developed for determining not only the quantity and type of subsurface microorganisms, but also their activity in terms of potential for biotransformation of pollutants. Methods will also be developed for in-situ detection of other subsurface parameters important to predicting pollutant behavior. Biological, physical/chemical, and hydrologic processes and their interrelations in the subsurface will be studied to develop mathematical representations that can be included in models. Subsurface (site-specific) characteristics that influence such processes will be determined. Finally, promising reclamation methods (e.g., biotransformation) will be studied at laboratory scale to evaluate their feasibility.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
RSKERL/Ada	Jack W. Keeley	4,045	25
OEPER/HQ	Steve Cordle	189	51

Water Quality

Scientific Assessment

EPA's overall research program with regard to water quality emphasizes development of the scientific and technical base to help states develop site-specific standards and to conduct use-attainability analyses. The scientific assessment program will develop *guidelines* for assessing the risk of human exposure to mixtures of toxic chemicals and will evaluate *site-specific* health *hazards* as required by the states and EPA.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ECAO/Cin	Steven Lutkenhoff	245	59
OHEA/HQ	Robert McGaughy	52	100

Monitoring Systems and Quality Assurance

The monitoring research program develops chemical, physical, and biological methods for measuring site-specific and ambient water pollution concentrations. Most of this research is conducted in-house at EMSL/Cincinnati.

Research on *chemical* measurement methods emphasizes standardization of measurement and quality assurance methods for priority toxic pollutants, as well as increasing the sensitivity of methods for measuring toxic metals in water. Research on *biological* monitoring methods emphasizes methods for screening toxic concentrations of pollutants in ambient waters, characterizing the biological condition of ambient waters, provision of quality assurance procedures to analyze chronic and acute toxicological effects, and standardization of microbial and viral sampling and analysis methods. Research on *physical* measurement methods concentrates on documenting the validity and accuracy of sampling and flow-sensing equipment. The *quality assurance* program provides quality control calibration materials and procedures for standardization of virus sample preservation and assay.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/Cin	Cornelius Weber James Lichtenberg John Winter	1,892	67
EMSL/LV	Roy Evans	380	100
OMSQA/HQ	Charles Plost	226	100

Health Effects

Related health effects research produces data for criteria documents. Investigators will use existing short-term tests for carcinogenic, mutagenic, and re-

productive effects to determine whether or not a site receiving a large number of chemical contaminants is a public health risk.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL/RTP	Richard J. Bull	550	64
OHR/HQ	Frode Ulvedal	70	100

Environmental Engineering and Technology

This program develops data correlating sludge treatment processes with environmental impacts for use in determining appropriate treatment levels for sludge prior to ocean dumping as well as treatment levels for wastewater discharged through ocean outfalls.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
MERL/Cin	Fred Bishop	202	100
OEET/HQ	Bala Krishnan	22	100

Environmental Processes and Effects

This program has two objectives: support for a water quality-based regulatory approach, and support for environmentally sound ocean disposal of wastes.

A *water quality-based* approach to pollution control provides for correction of ambient water quality problems that remain after mandated minimum pollution control technology (e.g., secondary treatment, effluent guidelines) is in place. This requires the ability to translate water quality standards into specific effluent condition and discharge limitations for municipalities and industry. Research will be undertaken to provide the necessary information base and scientific tools, including: site-specific criteria modification protocols, wasteload allocation techniques, bioassays and biomonitoring methods, and use attainability analyses.

The research program in ocean disposal will develop techniques and data for evaluating the impacts of alternative disposal strategies for identifying the optimal approach for both ocean dumping and discharge from ocean outfalls. Ocean dumping research will provide criteria for determining unreasonable degradation to potential dumping sites and protocols for characterizing wastes proposed for dumping. In addition, hazard assessment protocols will be developed based on estimates of the severity of ecological changes and on the transport and fate predictions of

ocean-dumped wastes. Biological procedures for monitoring dumpsites for long-term effects will be developed.

Ocean outfall research supports the water program office by assisting in 301(h) application review and by assisting with monitoring program reviews. Specific efforts include developing techniques for characterizing sediment conditions, assessing ecological impacts near outfalls for setting permit conditions, and developing protocols for characterizing the movement and persistence of pollutants common to ocean outfalls.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ERL/Athens	Walt Sanders	770	78
ERL/Cor	Tom Murphy	2,897	59
ERL/Dul	Nelson Thomas	2,088	80
ERL/Narr	Bill Brungs	1,802	73
ERL/GB	Tom Duke	785	97
OEPER/HQ	Sam Williams	747	68

Municipal Wastewater

Health Effects

Health effects research focuses on two areas: innovative technologies and municipal sludge disposal. The information from these areas are used by the agency for formulation of regulations, permits, and guidelines under the Clean Water Act. For *innovative and alternative* technologies, research seeks to assess the effects on human health resulting from exposure to pathogens, including parasites, viruses, and bacteria and to chemical toxicants contained in wastewater. Land disposal of *municipal sludge* requires careful assessment of the effects on human health of exposure to pollutants contained in the sludges. An appraisal will be prepared on the potential effects of land application of municipal sludge. Research will focus on pathogenic organisms, particularly parasites and viruses, heavy metals, and organic chemicals.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL/RTP	Richard J. Bull	1,947	45
OHR/HQ	Frode Ulvedal	122	100

Environmental Engineering and Technology

Revisions to the Clean Water Act provide incentives for the use of innovative wastewater treatment technology. This research program will provide engineering support to the innovative technologies and sludge management programs, and on techniques to improve the reliability of wastewater treatment plants.

In the area of *innovative/alternative* (I/A) technologies, assistance will be provided to the construction grant program in reviewing project plans, recommending innovative technologies, and in making available detailed planning, engineering and analytical assistance for innovative technology. Post-construction evaluations of full-scale operational projects will produce feedback information of design, energy, capital, and operation and maintenance costs.

Engineering support of *municipal sludge management* is provided in two areas — treatment and disposal. In the treatment area, emphasis will be on innovative stabilization digestion and thermal conversion processes that are more efficient in reducing the volume of sludge. Research in the disposal area will focus on characterizing the mechanisms controlling the uptake and the transformation of toxic organics and pathogenic organisms in sludge-amended soils.

In the *compliance achievement* support program, emphasis will be on providing design and cost in-

formation on two low cost upgrading methods through the integration of high biomass reactors and improved air aeration technology.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
MERL/Cin	James Kreissl (I/A) Joseph Farrell (sludge) Ed Barth (upgrading)	5,397	25
RSKERL/Ada	George Keeler	95	100
OEET/HQ	James Basilico	51	100

Industrial Wastewater

Monitoring Systems and Quality Assurance

Research will support the agency in the implementation of technology-based effluent limitation regulations and the modification of enforcement activities as required by water quality-based permit adjustments. Methods standardization research will be directed to the improvement in precision, accuracy, and method detection limit of existing regulated organic contaminants. Research will also validate and correct analytical methods for high priority industrial wastewater components and evaluate alternative analytical methods to support the National Pollution Discharge Elimination System (NPDES) program.

Quality Assurance activities include the Discharge Monitoring Report Quality Assurance (DMRQA) study; preparation and distribution of repository, quality control, and performance evaluation samples; and performance evaluation studies. The research program will support NPDES quality assurance by providing quality control samples and protocols and by maintaining the standards repository, including auditing monitoring systems data reliability, DMRQA and documention of its precision and accuracy.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/Cin	James J. Lichtenberg John A. Winter	1,322	70
OMSQA/HQ	Robert Medz	146	92

Environmental Processes and Effects

This program will provide information on the composition of complex industrial effluents. The information will be gathered from a review of the data which were generated by gas chromatographic/mass spectrometric analyses of industrial effluents.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ERL/Athens	Charles Anderson	311	100

Energy

Acid Rain

The acid rain program supports research in seven areas: estimating emissions, understanding atmospheric processes, monitoring, analyzing aquatic effects, analyzing terrestrial effects, quantifying effects on materials, and evaluating control techniques, and produces integrated assessments.

Estimating emissions from man-made sources: Emissions inventories will be developed focusing principally on SO_x and NO_x and expanding into volatile organic compounds and carbon monoxide. Models to forecast emission trends and costs of various control programs are being developed. These sectoral models and the emissions inventories will be used to support regional and national policy analysis and assessment.

Understanding atmospheric processes: This research is designed to improve our capability to examine and predict the movement of air masses. A comprehensive field study using chemical tracers of emissions, recently developed gas measuring instruments, and extensive monitoring may be undertaken to study the movement and transformation of acids and precursors from sources to receptors. Modules will be developed for the acid deposition regional model.

Developing a deposition monitoring data base: Efforts will be increased to develop real-time precipitation measurement methods, evaluate procedures for precision and accuracy of precipitation data, standardization of pH measurements, quality assurance and data system support, and analysis of the spatial and temporal variation of data.

Understanding and quantifying aquatic effects: Research will develop methods to determine trends in acidity and sensitivity of water bodies, estimate acid precipitation effects on the interactions between runoff and soil water, evaluate mitigation procedures such as liming, and determine the effects of acid precipitation on fish populations and other biota.

Quantifying terrestrial effects: A variety of field and laboratory studies will attempt to estimate and predict the effects of acid precipitation on forests, rangelands, wetlands, wildlife and crops. The effects of soil infiltration, soil chemistry, weathering, metal transport, exchange and depletion of nutrients and soil sensitivity will be addressed.

Quantifying the effects on materials and cultural resources: By developing an assay of materials at risk, we seek to estimate the extent of acid deposition effects.

Integration of research assessments: This program responds to questions that cut across several research objectives by supporting integrated assessment functions, characterization of mass flows, assessment of control strat-

egies, assessment of potentially sensitive areas, and economic analysis of controlling damage versus controlling emissions.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/Cin	Jack Pfaff	150	0
EMSL/RTP	Thomas Hauser	418	7
IERL/RTP	David Mobley	990	0
ESRL/RTP	Jack Durham	6,713	1
MERL/Cin	Gary Logsdon	100	0
ERL/Cor	Ray Wilhour	3,147	5
ERL/Dul	John Eaton	450	4
OER/HQ	Gary Foley	2,168	16

Health Effects

During 1984 the research in this area will focus on upgrading and evaluating the documentation of the health and environmental effects of synfuel pollutants. Specific areas: the methodologies for exposure assessment and health and environmental effects assessment will be upgraded for priority synfuel industries; the application of models for evaluating exposure pathways in atmospheric, terrestrial and aquatic media will be refined; synfuel pollutant uptake by key organisms in the human foodchain will be evaluated; and human exposure and effects data on synfuel pollutants to develop dose-response functions for cancer and reproductive risk analyses will be assessed.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ESRL/RTP	Jack Durham	216	100
ERL/Dul	Kenneth Biesinger	50	0
OEPER/HQ	Alan Moghissi	1,854	11

Environmental Engineering and Technology

This area is supporting two types of research: the development for commercialization of an integrated NO_x/SO_x control technology — Limestone Injection through a Multistage Burner (LIMB), and evaluation of pollutants from proposed synfuel facilities and alternate energy sources.

The *LIMB control technology* can substantially reduce both NO_x and SO_x emissions while at the same time reducing the costs for control. A systematic development is underway to bring the LIMB technology to the point where industry would be willing to commercialize it. The 1984 program will include: research on sorbent reaction mechanisms, research at the small bench and pilot scale for a wide range of

fuel types, pilot scale testing of the wall-fired design to extrapolate the performance to commercial scale, detailed analysis to identify potential operability and reliability problems, planning and site preparation for an industry - EPA cofunded full scale demonstration at a utility.

To help to control *synfuel pollutants*, EPA provides engineering support and technical assistance to the regional and state authorities, process developers and other interested parties. Applicants to the Synthetic Fuels Corporation (SFC) consult with the agency for preparation of their SFC required environmental monitoring plans. Operational testing of pollution controls and waste streams from pilot and commercial scale United States coal conversion plants currently under construction will be conducted in this research program. Also, procedures will be refined for comparative combustion/ sampling testing of liquid synthetic and petroleum-based fuels.

The laboratory at RTP is responsible for the evaluation of coal-based synfuel processes and characteration of the emissions and waste streams. The Cincinnati laboratory is responsible for characterizing and evaluating the emissions from oil shale, tar sands, geothermal and other energy-related technologies.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
IERL/Cin	Wally Liberick	595	50
IERL/RTP	R. P. Hangebrauck Jim Abbott	11,731	17
OEET/HQ	Kurt Jakobson Bill McCarthy	104	100

Environmental Processes and Effects

The Agency's Cold Climate Research Program is designed to define the impacts of oil and gas development, mining activities, and atmospheric pollution on arctic and sub-arctic environments and purpose mitigative measures. In FY-84, the program is completing a major evaluation of air quality in Anchorage and Fairbanks, Alaska, where the EPA carbon monoxide standard is chronically exceeded. Research will be initiated in FY-84 to address the impacts of oil and gas development on wetlands, the environmental impacts of placer mining, and the evaluation of asbestos contamination of rural-Alaskan drinking waters.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ERL /Cor	Norman Glass	225	0

Hazardous Wastes

Scientific Assessment

This program provides assessments of the health effects and risks arising from hazardous wastes; improved methods for performing such assessments; and, chemical-specific health summaries. These are supplied to the EPA's Office of Solid Waste (OSW) to support a variety of regulatory activities and to OSW, EPA regional offices and the states for use in evaluating permit and enforcement actions.

One type of *assessment*, the health and environmental effects profile, by exposure to it. The profiles support decisions on listing or delisting a chemical as a hazardous waste. Most of this work is done by extramural contract.

In addition, an in-house team develops *methods* to assess the extent of human health effects and human exposure to complex hazardous wastes. These methods support efforts to assess and refine proposed RCRA permits and to prepare supporting documentation for enforcement decisions. Finally, to support the prevention and containment of hazardous spills, extramural contractors develop chemical-specific *health summaries* for use in evaluating alternatives for dealing with hazardous spill contaminants.

Office or Laboratories	Contact	Total Funds ($k)	Percent In-House
ECAO/Cin	Michael Dourson	953	53
OHEA/HQ	Gregory Kew	558	82

Monitoring Systems and Quality Assurance

To improve procedures to *characterize* wastes for listing under RCRA, research will develop methods for characterizing and detecting particular wastes, and providing criteria for determining if those wastes constitute a potential hazard. Methods will be tested for application to highly toxic wastes in soil and sediments, for detection of organics in the ambient air of waste disposal facilities, and for determining the volatility and reactivity of wastes in all media.

Techniques for *field monitoring* of hazardous waste dumpsites will be improved, including statistics for sampling design and evaluated standard methods for media sampling. Of particular importance is post-closure monitoring of sites and investigation of new techniques for monitoring soils, and biota, ambient air, and waste incinerator emissions.

To support RCRA permitting and enforcement activities, research is developing *screening methods*, biological monitoring methods — including single and multi-lab evaluations and guidelines for stan-

dardized evaluations of biological methods — and is developing remote monitoring techniques. A substantial extramural effort will be directed toward validating waste incinerator test methods for toxic organic compounds and monitors for carbon monoxide and total hydrocarbons on waste incinerator stacks.

To support prevention and containment of hazardous releases, work will be done to develop techniques and methods to gather and *analyze* data through such means as aerial photos, and thermal and multispectral imagery techniques. Tasks will identify spills, spill movement, and to assist in cleanup operations.

Finally, to ensure that the data on which regulation and enforcement are based is accurate, *quality assurance* efforts will include distribution of analytical and standards reference materials, on-site field audits of sampling efforts, laboratory performance evaluations and support in methods used.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/Cin	James Lichtenberg John Winter	1,282	35
EMSL/LV	Glenn Schweitzer	4,799	45
EMSL/RTP	Thomas Hauser	1,203	12
OMSQA/HQ	John Koutsandreas	242	36

Health Effects

Listing of substances under RCRA requires the ability to characterize the potential health hazards of wastes. This research program focuses on developing a three-level biological testing battery of short-term tests to make determinations of the potential health hazard of manufacturing process residues. Emphasis will be on recognizing complex mixtures as hazardous wastes for disposal purpose. This current research is to develop two screens for Level 1 of the battery. The first, a prescreen protocol, will be an abbreviated and inexpensive screen for large numbers of Resource Conservation and Recovery Act (RCRA) samples. The other screen will be a Level 1 confirmation screening protocol to provide a more sensitive and more accurate assessment of the potential toxicity of RCRA samples. Levels 2 and 3 of the testing battery will not be the subject of research in this current plan.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL /RTP	Joellen Lewtas	903	35
OHR/HQ	Frode Ulvedal	65	100

Hazardous Wastes

Environmental Engineering and Technology

This program develops data on control technologies, how they work, and whether they will, in fact, allow hazardous waste disposal facilities to meet performance standards.

In order to develop performance standards for the treatment, storage, and disposal of hazardous wastes it is necessary to understand the *operational characteristics* of the different kinds of treatment and disposal available. Methods for use in measurement protocols will be developed to determine incinerator destruction efficiency and to continuously monitor control technology. With regard to *landfilling*, synthetic and natural liners will be studied and the effectiveness of alternative closure, and monitoring procedures for surface impoundments will be investigated. Technical Resource Documents will be developed for use by regional and state agencies for *permitting* hazardous waste disposal facilities and for *enforcing* applicable regulations. This program will update documents for disposal facility design, operation, maintenance, and closure. The *land treatment* program will develop a better understanding of the assimilative capacity of the land for hazardous wastes.

Incineration research is being carried out on four areas: laboratory scale, pilot scale, high temperature industrial incineration, and field performance assessment of full scale incinerators. Laboratory scale data will focus on data for destruction efficiency and by-products formation. Pilot scale research will focus on the destruction efficiencies of two types of incinerators for listed hazardous wastes and for wastes of specific interest to regions and states. The destruction of hazardous wastes by their combustion as a fuel in high temperature industrial processes will be investigated. Assessment of full-scale facilities will be done with emphasis on dioxins, polychlorinated biphenyls, and furans.

Finally, to provide technical support in preventing and containing hazardous *spills*, reports will be issued summarizing research on the evaluation of specialized equipment and techniques for prevention, control, removal, and disposal.

The implementation of this program is divided among four laboratories. The Municipal Environmental Research Laboratory is responsible for land disposal and control of hazardous skills, the Robert S. Kerr Environmental Research Laboratory is responsible for land treatment, the Industrial Environmental

Hazardous Wastes

Research Laboratory in Cincinnati is responsible for incineration research as well as for advanced technologies such as chemical, biological and physical treatment alternatives, and the Industrial Environmental Research Laboratory in RTP is responsible for the development of sampling and analysis protocols.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
IERL/Cin	E. Oppelt	6,262	21
MERL/Cin	N. Schomaker	6,300	21
IERL/RTP	J. Dorsey M. Wood	1,300	11
RSKERL/Ada	L. Myers Glenn Shira	1,926	31
OEET/HQ	Marshall Dick	478	100

Environmental Processes and Effects

Cost-effective decisions on regulation of hazardous wastes require methods for determining which waste constituents are hazardous, the potential impacts on human health and the environment of various disposal and regulatory options, and the suitability of sites proposed for disposal facilities. In addition, field-validated methods for quickly assessing the potential impacts of hazardous material releases (spills) on the environment are needed for decisions on counter-measures.

For determining whether wastes are hazardous, ERL/Duluth is adapting quantitative structure-activity relationship methods, developed for predicting the *toxicity* of single chemicals for use on multi-chemical wastes. RSKERL/Ada is developing microcosm (e.g., soil column) technology which will provide a relatively fast and inexpensive determination of the potential for wastes to move in the subsurface environment and thus to contaminate an aquifer.

Models are being developed to determine the exposure of humans and the environment to hazardous wastes. RSKERL/Ada is developing, improving, and field -evaluating ground-water models, while ERL/Athens is coordinating ground water and other routes of exposure (surface water, air) into multimedia methods which can predict exposure on a consistent basis through multiple routes.

Criteria developed in FY 1983 by RSKERL/Ada for *site selection* and evaluation based on hydrogeological factors will be evaluated in several hydrogeological settings in cooperation with the U.S. Geological Survey in FY 1984.

For *assessment* of the potential hazard of materials released into the terrestrial or aquatic environment,

Hazardous Wastes

ERL/Corvallis is developing and evaluating a multi-trophic level bioassay protocol. In FY 1984 the protocol will be evaluated at a second field site, and the protocol will be augmented with selected alternative testing techniques.

Three studies will be conducted to assist the Agency in defining the threat from dioxin contamination: its bioavailability in fish, its potential for human exposure through the food chain, and its mobility and persistence in soils and ground water.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ERL/Athens	George W. Bailey	808	55
RSKERL/Ada	Jack W. Keeley	1,480	39
ERL/Cor	Spencer A. Peterson	800	44
ERL/Dul	Philip M. Cook	1,127	64
ERL/Narr	Bill Brungs	180	100
OEPER/HQ	Stephen R. Cordle	245	66

Hazardous Substances, Non Energy

Monitoring Systems and Quality Assurance

This program supports the National Contracts Laboratory Program. There are three major activities: situation assessments, reportable quantities and enforcement and technical assistance.

Between 15 and 20 laboratories are involved in the National Contracts Laboratory Program which will perform the analytical tests for site and *situation assessment*. The ORD program will ensure the quality of the data from these laboratories through on-site laboratory evaluations, blind samples analyses, quarterly reviews and a 20 per cent data audit. Remote sensing provides detailed data on sites to help the Superfund Office to prioritize sites and determine methods of clean-up.

Reportable quantities regulations will be updated and strengthened by adding monitoring methods for new chemicals.

Enforcement cases will be provided with increased monitoring expertise to ensure that clean-up by industry is consistent with proved scientific protocols. Also, geophysical monitoring and a referee laboratory to provide quick turnaround will be available to the regions and the program office.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/LV	Glenn Schweitzer	2,569	37
EMSL/RTP	Thomas Hauser	348	37
EMSL/Cin	Robert Booth	654	25
OMSQA/HQ	Robert Holmes	78	95

Superfund

Scientific Assessment

This program provides technical support to the Office of Emergency and Remedial Response (OERR) for use in establishing and implementing regulations mandated by Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as well as technical support and assessment methods development for the Office of Waste Programs Enforcement (OWPE) for use in enforcement decisions. This program produces *rapid response health summaries*, for use by on-scene coordinators after hazardous materials spills or other emergency response situations. Evaluation of these chemical-specific summaries should permit a determination of potential hazards. The literature search is done by extramural contract.

Following emergency or remedial response at a hazardous waste site, residual levels of hazardous substances may remain in the environment. *Protocols* are being developed for estimating aggregate acceptability indices for exposure to residual levels of complex chemical mixtures. This is mainly an in-house project. In addition, *health effects data* are being gathered from the scientific literature and used to rank health risks posed by individual chemicals. The final ratings are one factor among several used in determining a "*reportable quantity*" for each chemical. The majority of this work is done by extramural contract.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ECAO/Cin	Richard Hertzberg	476	0
OHEA/HQ	Gregory Kew	317	0

Superfund

Environmental Engineering and Technology

Clean-up of uncontrolled hazardous waste sites requires technologies for response and remedial action, for protecting the personnel involved and for supporting enforcement actions.

The R&D support program evaluates *response* technology, demonstrating prototypical equipment such as mobile incineration systems and mobile soil washing systems. Direction will be provided for handling damaged and leaking drums, and for use of dispersants and/or coagulants. *Remedial* technology will be assessed and a handbook provided which will include design data, and cost and effectiveness information. Manuals will be developed establishing *personnel safety* protocols and evaluating equipment and techniques, especially for decontamination of equipment and personnel. In addition, short-term, quick turn-around technical advice and consultation will be provided to the regional programs and the Office of Waste Programs for *enforcement* support.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
MERL/Cin	Ronald Hill	3,634	21
OEET/HQ	Ray Thacker	81	0

Environmental Processes and Effects

To support on-scene coordinators of emergency and remedial response activities, a manual will be prepared which provides technical guidance on the mechanisms and applications of biological field sampling at hazardous waste sites. A comprehensive ground and surface water modeling applications guide will be produced for use in predicting the extent of contamination from hazardous waste sites. Technical assistance will be provided to Regions on ground water investigation methods, hydrology, and geology.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
OEPER/HQ	Steve Cordle	459	30

Toxic Substances

Scientific Assessment

The scientific assessment research program relating to toxic substances provides overview of scientific documents, and develops uniform methodologies and guidelines for performing risk assessments. To provide an *overview* of scientific documents, carcinogenicity, mutagenicity, adverse reproductive effects and exposure assessments are reviewed upon request from the Office of Toxic Substances. Newly developed data are being gathered to improve *risk assessment* methodologies and to ensure continuity throughout the agency in the use of risk assessment methods. Mutagenicity, carcinogenicity and exposure *guidelines* are being revised and reproductive effects guidelines are being developed.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
OHEA/HQ	K. S. Lavappa	245	69

Monitoring Systems and Quality Assurance

Efforts to protect human health from the adverse impacts of environmental exposure to toxic substances are supported by EPA research to improve monitoring capabilities, to more accurately determine exposure to chemicals, and to provide quality assurance. This research includes the development of new statistical techniques and sampling design methods for use in conducting the risk assessments required by the Toxic Substances Control Act.

Research related to monitoring human and environmental *exposure* to chemicals involves identification of the major transport and transformation processes. These processes are identified through monitoring data, and through monitoring systems capable of linking environmental concentrations of chemicals to human exposure. This exposure program requires the development of monitoring methodology to determine the extent of exposure and field testing of monitoring techniques and methods for a chemical of interest.

Quality Assurance efforts improve measurement methods, field monitoring systems, and associated protocols. Under this program, methods will be developed and evaluated for sampling and analyzing volatile organic compounds which are currently difficult to isolate. Biological measurements will be emphasized and deliverables will include guidelines for conducting collaborative tests of biological test methods as well as selected biological reference materials for use in various analytical procedures.

Toxic Substances

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/Cin	William Budde	266	0
EMSL/RTP	John Clements	1,361	27
EMSL /LV	Paul Richitt	2,694	42
OMSQA/HQ	Phyllis Daly	200	100

Health Effects

This research program identifies and quantifies risks to human health from toxic substances through testing methodology development, risk assessment methods development and structure-activity model development.

Testing methodology research has three purposes: to determine which laboratory tests best predicts the human response, to determine the chemical reactivity of metabolic intermediate compounds, and to improve biological mathematical extrapolation models.

Risk Assessment activities are directed primarily toward improving methods to predict toxicity based upon similarities in chemical structure, improving extrapolations from high-dose to low-dose, and improving extrapolations from animal species to humans.

Research into *structure-activity* relationships will be used to develop a method which can use data on molecular structure descriptors or combinations to predict genetic and carcinogenic activities using pattern recognition and statistical techniques. Also, we will construct a chemical data base in several areas of toxicological responses and relate each to effects upon individual organ systems.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL/RTP	Bill Durham	9,993	36
OHR/ HQ	Frode Ulvedal	555	46

Environmental Engineering and Technology

The focus of research in this program are: the identification and evaluation of alternatives to mitigate release and exposure of chemicals which will be used by the agency in regulating the manufacture and use of existing chemicals; the need for development of predictive capabilities to be used in assessing release and exposure in the review of Premanufacturing and New Use (PMN's) for new chemicals as required by TSCA; and the need for the assessment of physical, chemical and biological techniques and devices to contain and destroy genetically engineered organisms under TSCA.

The alternatives to mitigate release and exposure of

specific existing chemicals will be defined in cooperation with industry, through the evaluation and adaptation of control measures related to the release in the workplace and into the environment of the chemicals during their life cycles. Technologies, management practices, and personal protective equipment to limit the release and exposure of chemicals will be evaluated. Predictive models on treatability of chemicals will be assessed.

The models to predict the release and exposure of different classes of new chemicals will be developed in cooperation with industry. The models will address different chemical unit operations, unit processes and physical/chemical properties of chemicals and predict potential exposure and release levels as well as best control measures to mitigate release and exposure of new chemicals. Pilot scale testing for the treatability of classes of potentially toxic chemicals will be conducted to validate these predictive models for waste streams.

Program to support PMN review of genetically engineered organisms will be conducted through technology and engineering assessments of the potential for environmental contamination, and physical, chemical and biological techniques and devices to contain and destroy these organisms. Engineering safety and quality control program will be emphasized.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
IERL/Cin	Alden Christianson Ken Dostal	267	100

Environmental Processes and Effects

Determination of the movement, transformation, and ultimate disposition of toxic substances in all environmental media, and how plant and animal organisms and larger ecosystems in these media are affected by toxic substances, are the subjects of this research effort. This involves specific activities for developing and validating tests and methodologies for assessing environmental hazards and exposure, integrating these into risk assessments, developing structure-activity relationships (SAR) for rapid estimation of chemical fate and effects, and providing technical assistance on specific chemical evaluations and rule making.

Environmental hazard assessment research focuses on the development, improvement, and validation of single and multi-species toxicity tests (including

acute and chronic toxicity), bioconcentration assays, comparative toxicological relationships using fish, indirect human exposure methods, and system-level process tests. These studies involve freshwater, estuarine/marine, and terrestrial organisms. The developed methods are validated in both laboratory (microcosm) and field environments in order to define their applicability to real-world situations.

Studies on *environmental exposure assessment* develop tests and mathematical models of chemical transport and fate in order to determine the concentrations of toxic substances in various environmental media and to relate these to actual organism exposure. Work includes modeling pollutants in surface and subsurface terrestrial environments, modeling accumulation of toxic chemicals in food chains, and developing soil core microcosms for determining chemical fate and biodegradation processes. Laboratory and field studies are conducted as a final improvement/ verification step.

Environmental risk assessment studies, involving the linkage of environmental exposure and hazard assessment techniques, will be initiated.

Structure-activity relationship research develops methodologies based upon molecular structure characteristies to rapidly assess the environmental fate and toxicity of new chemicals. Structure-activity correlations include those for bioaccumulation, toxicity, and fate. Activities also include development of data bases on plant uptake, fate of organic chemicals, toxicity to fish, and reactivity of chemicals in air.

Technical assistance is provided the Office of Toxic Substances on complex problems relating to environmental fate, exposure, effects, hazards, and the environmental risk of toxic chemicals as necessary for risk assessment.

Activities in this program are carried out at several laboratories. The focus for extramural studies at each is as follows:

- ERL/Athens - transport and transformation of organic and inorganic substances in freshwater and multi-media environments, and development of SAR regarding fate of chemicals;
- ERL/Duluth - effects of toxic substances in freshwater environments, and development of SAR regarding effects of chemicals;
- ERL/Narragansett & ERL/Gulf Breeze - chemical fate and effects in marine/estuarine environments;

Toxic Substances

- ERL/Corvallis - fate and effects of toxic substances in terrestrial environments;
- RSKERL/Ada - terrestrial subsurface fate of chemicals.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
ESRL/RTP	Alfred H. Ellison	327	45
ERL /Athens	Walter M. Sanders	2,130	84
RSKERL/Ada	Clinton W. Hall	70	0
ERL/Cor	Thomas A. Murphy	1,317	72
ERL/Dul	Norbert A. Jaworski	1,235	68
ERL/Narr	William A. Brungs	1,397	94
ERL/GB	Henry F. Enos	1,076	67
OEPER/HQ	Charles W. Hendricks	472	69

Stratospheric Modification

The stratospheric modification research program will investigate the effects of pollutants on stratospheric ozone, the resulting ultraviolet-B radiation characteristics and of enhanced ultraviolet-B radiation on important crops and aquatic food-chain organisms. The program will continue coordination of federal research activities in this area, will update the comprehensive assessment of the state of science, will deliver the required biennial report to Congress, and will provide up-to-date information so that the most current data will be available for policy and regulatory decisions.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
OPSA/HQ	Herbert Wiser	875	15

Pesticides

Scientific Assessment

In support of EPA's role in regulating pesticides, EPA's researchers prepare health-related *risk assessments*. The following risk assessments will be prepared in 1984: carcinogenicity and mutagenicity, adverse reproductive effects, and exposure. Preparation and review of risk assessment documents for carcinogenicity, mutagenicity, adverse reproductive effects and exposure are conducted for pesticide compounds as requested by OPP. Risk assessment *guidelines* for mutagenicity, carcinogenicity, and exposure (dermal and inhalation) are being updated. Development of reproductive effects guidelines are in the initial stages of development.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
OHEA/HQ	K. S. Lavappa	440	93

Monitoring Systems and Quality Assurance

The pesticides quality assurance program ensures the accuracy of the data which is attained through testing and analysis. This program maintains a pesticide repository of high purity chemicals which are used by more than 1,400 laboratories in the United States and in foreign countries. These samples are used as standard reference samples for internal quality control. In addition, interlaboratory comparison samples are prepared. Also, the program will provide samples of pesticide chemicals no longer produced, but still regulated, in the United States. Such reference samples are necessary to perform analyses in soil, plant, or animal tissues at the required degree of accuracy.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/LV	Ross Robeson	879	54

Health Effects

This program develops methods to determine health endpoint and health effects, methods to determine risk, and ways to provide quality assurance.

To define the *health endpoints* of pesticides which are of concern, data will be provided on the immunological effects of biological pesticides on mammalian cells. In addition, research will investigate how pesticides affect children differently from adults.

In order to identify the *health effects* of pesticides EPA requires industry to supply specific pesticide data. EPA's research in this area develops test protocols and health assay methods for industry to use

to produce that data. During FY 1984, seven additional test methods will be developed in the areas of reproduction/teratology, mutagenesis/carcinogenicity (genotoxic effects) and neurotoxicology.

Research also develops methods to improve *risk assessment* to determine whether a pesticide poses unreasonable adverse risk to the public health and the environment. In 1984, this program will improve methods to assess the hazards of pesticides to children working in treated fields.

A computerized data management and analysis system for mutagenic/carcinogenic testing of pesticides will be developed and applied to assist in finding solutions to specific toxicological problems.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL/RTP	William F. Durham	2,572	63
OHR/HQ	Frode Ulvedal	165	39

Environmental Processes and Effects

This research works to determine the environmental transport, fate and effects of certain pesticides, to assess the environmental exposures and to assess hazard and associated risks. *Environmental effects* research will develop and field evaluate predictive techniques to estimate the effects of biological control agents and chemical pesticides on biota in aquatic and or terrestrial environments. Extramural research will be sponaored through EPA laboratories in Gulf Breeze, Corvallis, and Duluth on field evaluation of pesticide hazard assessment techniques.

To help to *assess environmental exposure* to pesticides, additional techniques will be developed to estimate adverse pesticide exposure in aquatic and terrestrial environments. Such determinations will include pesticide distribution and exposure levels in ecosystems and in physical habitats such as soil, sediment chemical measurements, and sorption kinetics. Extramural research through EPA laboratories in Athens and Gulf Breeze will focus on evaluation of predictive (modelling) techniques for environmental exposure in the field.

In support of agency development of *environmental risk assessment* capabilities, this research program will select environmental risk assessment methods for selected populations or their surrogates. Methods will be developed to perform assessments by integrating new or existing exposure and effects data on models. These methods are used by EPA in analyzing

Pesticides

the data submitted by industry to determine the risks and benefits from pesticide use. In addition, *technical assistance* is provided to the Office of Pesticides Programs on complex problems relating to environmental fate, exposure, effects, and hazards as necessary for risk assessment. The extramural portion of this program is carried out at several laboratories:

- ERL/Athens - transport and transformation of pesticides in freshwater and multi-media environments;
- ERL/Corvallis - exposure and effects of pesticides in terrestrial environments;
- ERL/Duluth - effects of pesticides in freshwater environments;
- ERL/Gulf Breeze - pesticide fate and effects in marine/estmarine environments.

Office of Laboratory	Contact	Total Funds ($k)	Percent In-House
ERL/ Athens	George Bailey	253	73
ERL/Cor	Thomas A. Murphy	241	79
ERL/Dul	Norbert A. Jaworski	337	85
ERL/GB	**Henry Enos**	1,176	98
OEPER/HQ	**Charles W. Hendricks**	262	100

Radiation

Monitoring Systems and Quality Assurance

The overall goal of the research program in radiation is to provide the scientifically credible data necessary to assess public exposure to nonionizing radiation and to man-made radioactive materials and to allow decisions to be made regarding control of that exposure.

In addition, this program provides quality assurance for the Agency's programs for monitoring radiation in the environment. These are supported by providing a common source of radionuclides standards and reference materials and through the conduct of laboratory intercomparison studies to assure data of known quality from analyses of environmental samples such as milk, water, air and food.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
EMSL/LV	Charles Costa	233	93

Health Effects

The goal of the radiation health research program is to provide data and methodologies to assess the health effects of exposure to non-ionizing radiation. The program currently focuses primarily on neurologic effects; long-term, low-level exposures; dose-extrapolation modeling (improving extrapolations from high to low dose and from animals to man); and studies on extremely low frequencies (ELF) (60 Hz).

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
HERL/RTP	Joe Elder	1,562	35

Intermedia

Exploratory Research Core Program

There are three major parts of the exploratory research program: the grants program, the research centers, and the scientific forecasting and planning program. The *grants program* supports research to advance the state-of-the-art in key areas of interest to the agency, which is announced annually in the *Solicitation for Exploratory Research Grants Proposals*. The *research center program* was evaluated in 1983 and management changes were implemented to improve EPA laboratory and program office interaction. A major effort was also instituted to compile and disseminate center research results initiated in 1981-1983. The research centers are:

Waste Elimination: (Illinois Institute of Technology and the University of Notre Dame) Innovative technology and process modification to reduce industrial pollutants.

Intermedia Transport: (University of California at Los Angeles) Definition of chemical/physical processes governing pollutant exchange at air-land and air-water boundaries.

Ecosystem Management: (Cornell University) Identify and apply ecosystem principles to environmental management problems.

Marine: (University of Rhode Island) Assess marine ecosystem health, emphasizing exposure of marine organisms to toxics.

Advanced Control Technology: (University of Illinois, Urbana) Separation technology, thermal destruction, biological separation, and chemical detoxification.

Ground Water: (University of Oklahoma, Oklahoma State University, and Rice University) Subsurface characterization, transport and fate, and groundwater horizon modelling.

Epidemiology: (University of Pittsburgh) Basic epidemiology methods and airborne particulate health effects.

Hazardous Waste: (Louisiana State University) Design, construction, maintenance, operation, and closure of hazardous waste landfills.

The *scientific forecasting and planning program* designed to identify leading indicators of environmental change and to assess the significance of emerging trends, problems, and opportunities. In addition, the program provides seed money to test high-risk and innovative concepts of potential future interest to the Agency in such areas as biological monitoring and biotechnologies. Finally, the explora-

Intermedia

tory research core program manages the agency's quality assurance program and the acid rain program, which are discussed elsewhere in this guide.

Office or Laboratory	Contact	Total Funds ($k)	Percent In-House
OER/HQ	Carl Gerber	15,266	2

Office of Research and Development Organization

The Office of Research and Development is responsible for a research, development, and demonstration program in pollution sources, fate, and health and welfare effects; waste management and utilization technology; environmental sciences; and monitoring systems. Please note, the list below includes both commercial (CML) and Federal (FTS) phone numbers. Where only one number is listed, it serves both purposes.

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Deputy Assistant Administrator
Herbert L. Wiser (Acting) (202)382-7676

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Cincinnati, OH 45268

Support Services Office
Director, Robert N. Carr (513)684-7966

Senior ORD Official, Research Triangle Park
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Research Triangle Park, NC 27711 FTS 8-629-2106

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Office of Research Program Management
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Program Coordination Staff
Chief, Mitch Luxenberg (202)382-7468

Regional Services Staff
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ORD Information Systems
Director, Tom DeMoss (202)382-7466

Center for Environmental Research Info.
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Cincinnati, OH 45268 (513)684-7394

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Strategic Scientific Assessment Staff
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Deputy Director, Paul A. Martin (202)382-7311
Headquarters, Washington, DC (RD-689)

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Exposure Assessment Group
Director, James Falco (202)382-7327

Reproductive Effects Assessment Group
Director, Peter Voytek (202)382-7303

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Industrial/Extractive Processes Division
Director, Glenn L. Shira (Acting) (202)382-2570

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Ira Wilder, Director
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Research Triangle Park, NC 27711

R. S. Kerr Environ. Research Laboratory
Director, Clinton W. Hall — CML(405)332-8800
Deputy Director, Marvin L. Wood — FTS 8-743-2224
P.O. Box 1198 — FTS 8-743-2226
Ada, OK 74820

Environmental Research Laboratory
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Deputy Director (Vacant) — FTS 8-250-3134
College Station Road
Athens, GA 30613

Environmental Research Laboratory
Director, Thomas A. Murphy — CML(503)757-4601
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200 SW 35th Street
Corvallis, OR 97330

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Marine Science Center
Newport, OR 97365

Environmental Research Laboratory
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Associate Director, B. Jones — FTS 8-783-9549
6201 Congdon Boulevard
Duluth, MN 55804

Newtown Fish Toxicology Station — (513)684-8601
3411 Church Street
Cincinnati, OH 45268

Monticello Field Station — CML only
Box 500 — (612)295-5145
Monticello, MN 55362

Large Lakes Research Station — CML(313)675-5000
9311 Groh Road — FTS 8-226-7811
Grosse Ile, MI 48138

Environmental Research Laboratory
Director, William Brungs (Acting) — CML(401)789-1071
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Water and Waste Management Division
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Deputy Director, Thomas A. Clark — **FTS 8-629-2106**
Research Triangle Park, NC 27711

Environmental Monitoring Systems Laboratory
Director, Robert L. Booth (Acting) — **(513)684-7301**
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Deputy Director, Richard Stanley	FTS 8-545-2525
P.O. Box 15027	
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Vint Hill Station	
Director, Vernon Webb	CML(703)347-6224
P.O. Box 1587, Building 166	FTS 8-557-3110
Warrenton, VA 22186	

ORD Organization Description

Office of Exploratory Research

The Office of Exploratory Research assesses future environmental trends and problems, and funds extramural research to meet agency needs for basic scientific knowledge. Its activities include the following: managing EPA's long-term research programs, forecasting future environmental problems, identifying institutional and training needs, managing EPA's participation in the National Acid Precipitation Assessment Program, implementing an agency-wide quality assurance program, designing data management programs, and studying high priority environmental needs and problems.

Office of Environmental Engineering and Technology

The Office of Environmental Engineering and Technology is responsible for the assessment and the development of methods for control of the environmental and socio-economic impacts of industrial operations and of energy and mineral resource extraction, processing, conversion, and utilization systems.

The Industrial Environmental Research Laboratory in Cincinnati, Ohio, investigates ways to prevent, control, or abate the pollution associated with the extraction, processing, conversion, and use of mineral resources. This includes work on closed-loop systems to eliminate waste discharges, ways to change industrial processes so that less waste is produced, and cost-effective techniques for removing and disposing of pollutants.

The Municipal Environmental Research Laboratory in Cincinnati, Ohio, investigates ways to prevent, control, and treat municipal pollutants. This includes developing cost-effective methods of providing safe drinking water, community environmental management, solid and hazardous waste disposal, wastewater treatment, and new and improved technology for collecting, transporting, processing and disposing of solid and hazardous wastes.

The Industrial Environmental Research Laboratory in Research Triangle Park, North Carolina, assesses the environmental impacts of energy production and industrial processes, and develops cost-effective techniques and modifications for conserving energy and helping industries meet environmental quality standards for air, water, solid waste, thermal discharge and pesticides.

Office of Health Research

The Office of Health Research is responsible for the development and provision of information to enable the Agency more accurately to estimate human mortality and morbidity from environmental noxae. From this mission, three principal areas of research are derived:

- the generation of dose-response data
- the development of test methods to generate dose-response data, and,
- the development of methods to use dose-response data to estimate human mortality and morbidity.

The Health Effects Research Laboratory in Research Triangle Park, North Carolina, studies the health impacts of air pollutants, toxic substances, non-ionizing radiation (radar, microwaves, etc.) and pesticides. It includes one of the nation's few human exposure facilities. In addition the Toxicology and Microbiology Division in Cincinnati, Ohio, studies the health impacts of water pollutants and drinking water.

Office of Environmental Processes and Effects Research

The Office of Environmental Processes and Effects Research develops the scientific and technological methods and data necessary to understand, predict, and manage the entry, movement, and fate of pollutants in the environment and the food chain, and to determine the effects of pollutants upon nonhuman organisms and ecosystems.

The Robert S. Kerr Environmental Research Laboratory in Ada, Oklahoma, conducts research and development projects on ground water, natural systems for treating wastewater, and the land treatment of hazardous wastes.

The Environmental Research Laboratory in Athens, Georgia, identifies and traces the movement of pollutants through soil and water, and the subsequent changes that take place there. This includes agricultural and silvicultural sources of pollution, and environmental systems to control them; and development of models to help judge the environmental consequences of a contaminant reaching certain parts of water-soil systems.

The Environmental Research Laboratory in Corvallis, Oregon, determines the effects of pollution on terrestrial, freshwater, and marine ecosystems —linking air, land, and water. Studies include air pollutant effects on terrestrial and aquatic ecosystems, toxic effects of

chemicals on plants and animals in terrestrial and aquatic ecosystems, storative efforts for dying lakes, the effects of pollution on wetlands, the effects of runoff, and impacts of energy development in cold climates.

The Environmental Research Laboratory in Duluth, Minnesota, conducts research on the toxic effects of chemicals, pesticides and other pollutants on freshwater ecosystems. This laboratory has primary research responsibility for describing the fate and effects of pollutants that enter the Great Lakes.

The Environmental Research Laboratory in Narragansett, Rhode Island, studies the impacts of pollution on marine ecosystems, including the build-up of pollutants, chemical and physical behavior of pollutants in ocean life systems, and responses of marine organisms to environmental stress. This research provides a base for agency decisions on use of the oceans, specifically regarding ocean dumping.

The Environmental Research Laboratory in Gulf Breeze, Florida, conducts research on the exposure-effects relationships of hazardous pollutants on marine, coastal, and estuarine ecosystems. Emphasis is on the South Atlantic and Gulf Coasts, and on the impacts of petroleum extraction on marine life.

The Environmental Sciences Research Laboratory in Research Triangle Park, North Carolina, determines the effects of air pollution on the atmosphere, and subsequent effects on air and water quality and land use. It also assesses the effects of pollution on weather and climate, and develops mathematical models for relating pollution emissions to air quality and for forecasting potential air pollution crises.

Office of Monitoring Systems and Quality Assurance

The Office of Monitoring Systems and Quality Assurance is responsible for the development and demonstration of monitoring systems, quality control of pollutant measurement and monitoring techniques (quality assurance), and technical support services.

The Environmental Monitoring Systems Laboratory in Research Triangle Park, North Carolina, develops methods to measure and monitor pollutants in ambient air and emissions sources; operates the quality assurance program for measurement of air pollutants, develops techniques to assess population exposure to air pollutants; and, characterizes non-criteria pollutants in air.

The Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, conducts research and development programs related to monitoring of pollutants in the environment, develops sampling strategies and techniques for monitoring hazardous waste leachates in soil and groundwater, develops remote sensing techniques, evaluates analytical methods for the characterization and quantification of hazardous wastes, and provides quality assurance in support of the EPA's hazardous waste, "Superfund," pesticides and ionizing radiation programs.

The Environmental Monitoring and Support Laboratory in Cincinnati, Ohio, standardizes analytical test procedures to identify and measure major pollutants and microorganisms of health significance in drinking water, ambient receiving waters, and municipal and industrial effluents; operates the quality assurance program for the monitoring data on water pollutants; develops screening methods for use at hazardous waste sites; and provides technical support to water and waste monitoring programs.

Office of Health and Environmental Assessment

The Office of Health and Environmental Assessment is responsible for an Agency-wide program to provide a scientific foundation for evaluating the effects of environmental pollutants in varying exposure situations on human health and ecological systems and determining the degree of risks from these exposures.

The Environmental Criteria and Assessment Office in Research Triangle Park, North Carolina, is responsible for preparing air quality criteria documents and air pollutant health assessment documents for use in Agency regulatory activities, as well as legislatively required health-related reports.

The Environmental Criteria and Assessment Office in Cincinnati, Ohio, prepares health and hazard assessment documents on water pollution and solid and hazardous wastes and hazardous air pollutants. Additionally, comprehensive methodologies are prepared for health assessments of both single chemicals and complex mixtures. Technical assistance to various agency program and Regional Offices concerning acceptable pollutant levels and dose-response relations are also provided.

Office/Laboratory Abbreviations

CERI/Cin Center for Environmental Research Information
Cincinnati, OH 45268
(513)684-7394

ECAO/Cin Environmental Criteria and Assessment Office/
Cincinnati, OH 45268
(513)684-7531

ECAO/RTP Environmental Criteria and Assessment Office/
Research Triangle Park, NC 27711
CML(919)541-4173
FTS 8-629-4173

EMSL/Cin Environmental Monitoring and Support
Laboratory/Cincinnati, OH 45268
(513)684-7301

EMSL/LV Environmental Monitoring Systems Laboratory/
Las Vegas, NV
P.O. Box 15027
Las Vegas, NV 89114
CML(702)798-2100
FTS 8-545-2100

EMSL/RTP Environmental Monitoring Systems Laboratory/
Research Triangle Park, NC 27711
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ERL/Narr Environmental Research Laboratory/Narr.
South Ferry Road
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CML(919)541-2191
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HERL/RTP Health Effects Research Laboratory/
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IERL/Cin	Industrial Environmental Research Lab./ Cincinnati, OH 45268 (513)684-4402
IERL/RTP	Industrial Environmental Research Lab./ Research Triangle Park, NC 27711 CML(919)541-2821 FTS 8-629-2821
MERL/Cin	Municipal Environmental Research Lab./ Cincinnati, OH 45268 (513)684-7951
OEET/HQ	Office of Environmental Engineering and Technology (RD-681) Washington, DC 20460 (202)382-2600
OEPER/HQ	Office of Environmental Processes and Effects Research (RD-682) Washington, DC 20460 (202)382-5950
OER/HQ	Office of Exploratory Research (RD-675) Washington, DC 20460 (202)382-7449
OHEA/HQ	Office of Health and Environmental Assessment (RD-689) Washington, DC 20460 (202)382-7317
OHR/HQ	Office of Health Research (RD-683) Washington, DC 20460 (202)382-5900
OMSQA/HQ	Office of Monitoring Systems and Quality Assurance (RD-680) Washington, DC 20460 (202)382-5767
RSKERL/Ada	Robert S. Kerr Environmental Research Lab./ Ada, OK P.O. Box 1198 Ada, OK 74820 CML(405)332-8800 FTS 8-743-2011 SW-967

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